

REMARKS

The applicants have carefully considered the Office action dated February 19, 2010. By way of the forgoing amendments, claim 1 has been amended. No new subject matter has been added.

Claims 1-29 remain pending and at issue. Of the claims at issue, claim 1 is independent.

In view of the foregoing amendments and the following remarks, reconsideration of the application is respectfully requested.

Information Disclosure Statement

The applicants submit herewith an Information Disclosure Statement including an English language translation of the Abstract of the each of the non-English references previously submitted. The applicants respectfully request consideration of the submitted references.

The Rejections under 35 U.S.C. § 103

Claims 1-12, 18, and 20-29 stand rejected as being unpatentable over Chapelon (US 5,720,287) in view Fulio (US 5,471,988). Claims 13-17, and 19 stand rejected as being unpatentable over Chapelon and Fujio in further view of Wilk (US 2005/0020918). It is respectfully submitted that all claims are allowable over these patents for at least the reasons set forth below.

Independent claim 1 is directed to a device for ultrasonic treatment of an object. Claim 1 has been amended to clarify that the claims recite heating an object using ultrasound. In particular, claim 1 recites, *inter alia*, an ultrasonic transducer that generates an ultrasonic field and the temperature focus of the field is located in an object for heating thereof. Claim 1 further requires that the front portion is thermally insulating, such that the transmitter element does not substantially heat the front portion. This avoids heating of tissue in the area in front of the tip between the tip and the temperature focus (e.g. in order to provide a local temperature increase in nucleus pulposus without overheating the surrounding annulus fibrosus, see page 4, lines 8-18 of the PCT publication).

Claim 1 was rejected as obvious over Chapelon in view of Fulio. It is well established, however, that the prior art must teach or suggest each of the claim elements ... to establish a *prima facie* case of obviousness. See *In re Oetiker*, 24 USPQ. 2d 1443, 1446 (Fed. Cir. 1992); *Ex parte*

Clapp, 227 USPQ. 972, 973 (Bd. Pat. App. 1985); *In re Royka*, 490 F.2d 981 (CCPA 1974) and M.P.E.P. § 2143. Neither Chapelon nor Fulio, either alone or in combination, describes or suggests a thermally insulating front portion. Accordingly, it follows that neither Chapelon nor Fulio, either alone or in combination can render obvious claim 1 or any claims dependent thereon.

In contrast, Chapelon is directed to a therapy and imaging probe for endocavital or intraluminal therapy/diagnosis. (*Chapelon*, col. 3, ll. 34-36). The specific embodiment shown in FIG. 5 includes a flexible wall positioned in front of a rotatable member comprising a therapy and imaging transducer. Chapelon does not, however, describe a thermally insulating front portion, as admitted by the examiner.

To cure the admitted deficiencies of Chapelon, the examiner relies upon Fujio, stating that Fujio is configured to be thermally insulating. In sharp contrast, however, Fujio describes the use of a cooling liquid to remove heat. It is well known to one of ordinary skill in the art that the purpose of a cooling liquid is to transfer heat away from a location, e.g., to promote heat transfer. The promotion of heat transfer and the thermal insulation of portion of the probe are diametrically opposite, i.e., preventing heat transfer, and promoting heat transfer.

Moreover, modifying the probe in Chapelon with a thermally insulating front portion would not be desirable. In particular, the ultrasonic probe described by Chapelon includes a flexible region 41 surrounding a cavity filled with a cooling liquid. (*Chapelon*, col. 10, ll. 65-67). To modify the front portion/flexible portion with a thermal insulator would limit the capabilities of the cooling liquid in the cavity to transfer heat away from the tissue positioned next to the ultrasound/probe. Thus, tissue positioned next to the ultrasound transducer would be heated by two sources, the ultrasonic energy and the heat generated by the transducer itself. Therefore, if the probe described by Chapelon were modified to include a thermally insulating front portion, the heat delivered to the tissue next to the probe by ultrasonic energy would be prevented from being transferred away by the cooling liquid, thus resulting in a localized increase in temperature next the probe, with harmful side effects.

Accordingly, due to the deficiencies in both Chapelon and Fujio, it follows that no combination of Chapelon and Fujio can render obvious claim 1 or any claims dependent thereon. In particular, because neither Chapelon nor Fujio describes a thermally insulated tip front portion, no combination of Chapelon and Fujio can result in a system in which the transmitting element does not substantially heat the front portion during operation as claimed. Accordingly, it is respectfully submitted that claim 1 and all claims dependent thereon are in condition for allowance.

Claims 2-3

Claim 2 further specifies that the ultrasonic probe comprises a focusing device for focusing the ultrasonic field. Claim 3 further specifies that between the transmitter element and the focusing device for focusing the ultrasonic field in temperature focus is in the range of 0.5-20 centimeters. It is respectfully submitted that the distance between the focusing device and the ultrasonic field generator (i.e., the length from the transmitter element to the focusing device) is not the same as the focal length (i.e., the distance from the center of the lens to the principal foci (or focal points) of the lens). It may be conventional to have a transmitter element with a focal length in the claimed range, however, it is highly unconventional to have a focusing device positioned away from the transmitter element in the claimed range.

The advantages of having an ultrasonic probe according to claim 2 and 3 include limiting damage to the tissue next to the probe. For example, in an ultrasonic probe having a focusing device positioned with a distance to the transmitter element between 0.5 and 20 cm, the probe generates lowly focused ultrasonic waves that propagate down through the ultrasonic probe until they are focused by the focusing device. This setup allows the ultrasonic energy to be distributed over a larger area of the tissue next to the probe, thereby limiting the heating of the tissue next to the probe. By reducing the heating of tissue next to the probe, the damage associated therewith is minimized.

Accordingly, it is respectfully submitted that claims 2 and 3 are similarly in condition for allowance.

Conclusion

Reconsideration of the application and allowance thereof are respectfully requested. If there is any matter that the examiner would like to discuss, the examiner is invited to contact the undersigned representative at the telephone number set forth below.

The Commissioner is hereby authorized to charge any deficiency in the amount enclosed or any additional fees which may be required during the pendency of this application to Deposit Account No. 12-0400.

Respectfully submitted,
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